



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR  | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|-----------------------|---------------------|------------------|
| 10/064,510      | 07/23/2002  | Thomas Martin Angeliu | RD-28181            | 6622             |

6147 7590 11/26/2004

GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER

WYSZOMIERSKI, GEORGE P

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1742

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/064,510

Applicant(s)

ANGELIU, THOMAS MARTIN

Examiner

George P Wyszomierski

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20040830.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) 29-63 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 24-28 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

Art Unit: 1742

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 3, 5, 6, 7, 11, 12, 15, 18, 19, 24 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang (PG Publication 2003/0148042). This is a new ground of rejection.

Wang discloses producing a nano-composite material by introducing nano-sized particles of aluminum oxide into a liquid material, together with a surface modifying agent which contains zirconium; see paragraphs [0098] and [0099], and Table 2 of Wang. The nano-sized particles are of a size as recited in instant claims 11 and 12; see paragraph [0076] of Wang. This mixture is ultrasonically agitated at a frequency as recited in instant claims 18 and 19; see paragraph [0074] of Wang. With respect to instant claims 24 and 25, the total amount of particles in example 2 of Wang is  $(4.32 + 1.08) / 103.78$ , or about 5.2%, which clearly meets the limitation of claim 24 and which the examiner is taking to meet the "up to about 5" limitation of claim 25. Thus, all aspects of the claimed invention are held to be fully met by Wang.

3. Claims 1-12, 17, and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Angeliu et al. (U.S. patent 6,251,159).

The prior art discloses dispersion strengthening of a metal by adding nanoparticles to a molten metal. A dispersing agent is also added with the particles; see Angeliu column 3, lines 60-63. The materials used by Angeliu may be the same as those recited in the instant claims (see Angeliu column 3, lines 20-25), and may have a size and interparticle spacing as presently claimed; see columns 4-5 of Angeliu. With regard to claim 17, the examiner's position is that it would be inherent that any material which coats the nanoparticles would be at least one monolayer in thickness, as no particular minimum dimension for this monolayer is defined in the instant claim. Thus, all aspects of the claimed invention are held to be either fully disclosed or inherent in the disclosure of Angeliu et al.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Wang or Angeliu et al.

The prior art references, discussed in items 2 and 3 supra, do not specify the shape of the nanoparticles employed in their respective processes as defined in claims 13 and 14. However, the use of nanoparticles having the shape(s) as presently defined would fall within the purview of the disclosures of Wang or Angeliu, i.e. one of skill in the art would expect that the composition of the particles relative to that of the molten material, rather than the shape of the particles, would determine whether a given type of particle would be suitable in the prior art

processes. Thus, a prima facie case of obviousness is established between the disclosures of Wang or Angeliu et al. and the presently claimed invention.

6. Claims 16 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined disclosures of Angeliu et al. and Wang.

With respect to instant claim 16, Wang discloses a method as claimed except that Wang does not specify coating nanoparticles with a ceramic, an intermetallic, or a metal as presently claimed. However, Angeliu indicates that it was known in the art, at the time of the invention, to disperse nanoparticles using dispersion agents which are metals or ceramics; see, for instance, Angeliu column 3, lines 60-64.

With respect to instant claims 26-28, Wang discloses dispersing nanoparticles within a molten material using a combination of ultrasonic agitation and a wetting agent, or material which according to Wang paragraph [0098] provides better compatibility between inorganic (the particles) and organic matrix (the liquid). Wang does not specify the inter-particle spacing recited in the instant claims. Angeliu, particularly claim 10 therein, indicates that it was conventional in the art at the time of the invention to form nano-composites having the presently claimed interparticle spacing by means of dispersing nanoparticles in a liquid matrix.

Thus, the combination of Wang together with Angeliu et al. would have taught the presently claimed invention to one of ordinary skill in the art.

7. In a response filed August 30, 2004, Applicant provided arguments with respect to the rejections made in the Office Action of June 24, 2004. To the extent that Applicant's arguments still apply, the examiner comments as follows:

Art Unit: 1742

a) The rejections based on McCullogh and/or Lin are withdrawn at this time as the Wang and Angeliu references are clearly more pertinent to the claimed invention.

b) Applicant indicates that the Angeliu reference does not suggest the use of ultrasonic energy for dispersion of particles in the melt. While this is correct, the examiner notes that instant claims 1-17 and 20-25 do not require an ultrasonic step, i.e. the ultrasonic step is merely one option in a Markush group in independent claim 1. With regard to the remainder of the claims, the examiner believes that the newly cited Wang disclosure provides a proper basis for rejection of these claims, as set forth herein.

8. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Wyszomierski whose telephone number is (571) 272-1252. The examiner can normally be reached on Monday thru Friday from 8:00 a.m. to 4:30 p.m. Eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on (571) 272-1244. Effective October 1, 2003, all patent application related correspondence transmitted by facsimile must be directed to the central facsimile number, (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



GEORGE WYSZOMIERSKI  
PRIMARY EXAMINER

GPW  
November 23, 2004